

THE ASTROPHYSICAL JOURNAL
CONTENTS OF VOLUME 486, PART 1

1997 SEPTEMBER 1, Number 1

	Page
CEPHEID CALIBRATION OF THE PEAK BRIGHTNESS OF TYPE Ia SUPERNOVAE. VIII. SN 1990N IN NGC 4639 <i>A. Saha, Allan Sandage, Lukas Labhardt, G. A. Tammann, F. D. Macchetto, & N. Panagia</i>	1
LARGE-SCALE POWER SPECTRUM FROM PECULIAR VELOCITIES VIA LIKELIHOOD ANALYSIS <i>Saleem Zaroubi, Idit Zehavi, Avishai Dekel, Yehuda Hoffman, & Tsfrir Kolatt</i>	21
PECULIAR HUBBLE FLOWS IN OUR LOCAL UNIVERSE <i>Xiangdong Shi</i>	32
TESTING COSMOLOGICAL MODELS AGAINST THE ABUNDANCE OF DAMPED LYMAN-ALPHA ABSORBERS <i>Jeffrey P. Gardner, Neal Katz, David H. Weinberg, & Lars Hernquist</i>	42
ANGULAR MOMENTUM TRANSPORT IN EARLY-FORMED OBJECTS BY COSMIC BACKGROUND RADIATION: RADIATION-HYDRODYNAMICAL APPROACH <i>Tohru Tsuribe & Masayuki Umemura</i>	48
IMPROVED CALIBRATION OF COSMIC DISTANCE SCALE BY CEPHEID PULSATION PARALLAXES <i>G. P. Di Benedetto</i>	60
A SURVEY FOR LARGE-IMAGE SEPARATION LENSED QUASARS <i>Dan Maoz, Hans-Walter Rix, Avishay Gal-Yam, & Andrew Gould</i>	75
PLANET PARAMETERS IN MICROLENSING EVENTS <i>B. Scott Gaudi & Andrew Gould</i>	85
A GENERALIZATION OF THE V/V_{\max} TEST <i>Y. P. Qin & G. Z. Xie</i>	100
CUSPS AND TRIAXIALITY <i>David Merritt</i>	102
EVOLUTION OF SUPERNOVA EXPLOSION RATES IN THE UNIVERSE <i>H. E. Jørgensen, V. M. Lipunov, I. E. Panchenko, K. A. Postnov, & M. E. Prokhorov</i>	110
RADIO POLARIZATION IN EGRET BLAZARS <i>Amber L. Iler, Jonathan F. Schachter, & Mark Birkinshaw</i>	117
EGRET OBSERVATIONS OF THE GAMMA-RAY SOURCE 2CG 135+01 <i>D. A. Kniffen, W. C. K. Alberts, D. L. Bertsch, B. L. Dingus, J. A. Esposito, C. E. Fichtel, R. S. Foster, R. C. Hartman, S. D. Hunter, G. Kanbach, Y. C. Lin, J. R. Mattox, H. A. Mayer-Hasselwander, P. F. Michelson, C. von Montigny, R. Mukherjee, P. L. Nolan, J. M. Paredes, P. S. Ray, E. J. Schneid, P. Sreekumar, M. Tavani, & D. I. Thompson</i>	126
OPTICAL AND FAR-INFRARED EMISSION OF IRAS SEYFERT GALAXIES <i>Charles J. Bonatto & Miriani G. Pastoriza</i>	132
THICK TORI AROUND ACTIVE GALACTIC NUCLEI: THE CASE FOR EXTENDED TORI AND CONSEQUENCES FOR THEIR X-RAY AND INFRARED EMISSION <i>Gian Luigi Granato, Luigi Danese, & Alberto Franceschini</i>	147
X-RAY FLUCTUATIONS FROM ADVECTION-DOMINATED ACCRETION DISKS WITH A CRITICAL BEHAVIOR <i>Mitsuru Takeuchi & Shin Mineshige</i>	160
FURTHER EVIDENCE FOR SOME GAMMA-RAY BURSTS CONSISTENT WITH PRIMORDIAL BLACK HOLE EVAPORATION <i>D. B. Cline, D. A. Sanders, & W. Hong</i>	169
FAINT SOURCES IN THE EUVE SURVEY: IDENTIFICATION OF WHITE DWARFS, ACTIVE LATE-TYPE STARS, AND GALACTIC NUCLEI <i>Elisha Polonski, Stéphane Vennes, John R. Thorstensen, Mihalis Mathioudakis, & Emilio E. Falco</i>	179

	Page
DYNAMICS OF GALAXY MERGING AND THE ORIGIN OF THE COLOR-MAGNITUDE RELATION OF ELLIPTICAL GALAXIES <i>Kenji Bekki & Yasuhiro Shioya</i>	197
ON THE ORIGIN OF THE UV UPTURN IN ELLIPTICAL GALAXIES. I. SENSITIVITY OF UV POPULATION SYNTHESIS TO VARIOUS INPUT PARAMETERS <i>Sukyoung Yi, Pierre Demarque, & Augustus Oemler, Jr.</i>	201
THE DYNAMICS OF THE M87 GLOBULAR CLUSTER SYSTEM <i>Judith G. Cohen & Anton Ryzhov</i>	230
A DEEP LOOK AT THE EMISSION-LINE NEBULA IN ABELL 2597 <i>G. Mark Voit & Megan Donahue</i>	242
DETECTION OF NEUTRAL GAS IN THE CENTRAL GALAXY OF THE CENTAURUS CLUSTER <i>William B. Sparks, C. Marcella Carollo, & Ferdinando Macchetto</i>	253
H II REGION ABUNDANCES IN THE POLAR RING OF NGC 2685 <i>Paul B. Eskridge & Richard W. Pogge</i>	259
GAMMA-RAY EMISSION FROM ADVECTION-DOMINATED ACCRETION FLOWS AROUND BLACK HOLES: APPLICATION TO THE GALACTIC CENTER <i>Rohan Mahadevan, Ramesh Narayan, & Julian Krolik</i>	268
AN OUT-OF-PLANE CO ($J = 2-1$) SURVEY OF THE MILKY WAY. II. PHYSICAL CONDITIONS OF MOLECULAR GAS <i>Seiichi Sakamoto, Tetsuo Hasegawa, Toshihiro Handa, Masahiko Hayashi, & Tomoharu Oka</i>	276
SELF-SIMILAR MAGNETOCENTRIFUGAL DISK WINDS WITH CYLINDRICAL ASYMPTOTICS <i>Eve C. Ostriker</i>	291
PARKER INSTABILITY IN NONUNIFORM GRAVITATIONAL FIELDS. III. THE EFFECT OF A CORONA <i>Hideyuki Kamaya, Toshiro Horiuchi, Ryoji Matsumoto, Tomoyuki Hanawa, Kazunari Shibata, & Shin Mineshige</i>	307
CHEMICAL EVOLUTION IN PREPROTOSTELLAR AND PROTOSTELLAR CORES <i>E. A. Bergin & W. D. Langer</i>	316
AUSTRALIA TELESCOPE COMPACT ARRAY OBSERVATIONS OF RADIO RECOMBINATION LINES TOWARD 30 DORADUS <i>A. B. Peck, W. M. Goss, H. R. Dickel, P. R. Roelfsema, M. J. Kesteven, J. R. Dickel, D. K. Milne, & S. D. Points</i>	329
THE BIPOLAR HR CARINAE NEBULA: DYNAMICS AND CHEMICAL ABUNDANCES <i>Antonella Nota, Linda Smith, Anna Pasquali, Mark Clampin, & Matthew Stroud</i>	338
MILLISECOND PULSATIONS FROM A LOW-MASS X-RAY BINARY IN THE GALACTIC CENTER REGION <i>Tod E. Strohmayer, Keith Jahoda, A. Barry Giles, & Umin Lee</i>	355
LITHIUM PRODUCTION IN HOT ADVECTION-DOMINATED ACCRETION FLOWS IN SOFT X-RAY TRANSIENTS <i>Insu Yi & Ramesh Narayan</i>	363
THE STRUCTURE AND APPEARANCE OF PROTOSTELLAR ACCRETION DISKS: LIMITS ON DISK FLARING <i>K. R. Bell, P. M. Cassen, H. H. Klahr, & Th. Henning</i>	372
CELLULAR-AUTOMATON MODEL FOR FLICKERING OF CATAclysmic VARIABLES <i>Atsunori Yonehara, Shin Mineshige, & William F. Welsh</i>	388
DIAMAGNETIC BLOB INTERACTION MODEL OF T TAURI VARIABILITY <i>Yigal Ulitchin, Oded Regev, & Claude Bertout</i>	397
FAST TIDES IN SLOW STARS: THE EFFICIENCY OF EDDY VISCOSITY <i>Jeremy Goodman & Siang Peng Oh</i>	403
THE COOLING OF CO WHITE DWARFS: INFLUENCE OF THE INTERNAL CHEMICAL DISTRIBUTION <i>Maurizio Salaris, Immaculada Domínguez, Enrique García-Berro, Margarida Hernanz, Jordi Isern, & Robert Mochkovitch</i>	413
A K-BAND SPECTRAL ANALYSIS OF WOLF-RAYET STARS <i>Donald F. Figer, Ian S. Mclean, & Francisco Najarro</i>	420
THE NATURE AND EVOLUTIONARY HISTORY OF GRO J1744-28 <i>S. Rappaport & P. C. Joss</i>	435
ECLIPSE MAPPING OF THE ACCRETION DISK WIND IN THE CATAclysmic VARIABLE UX URSAE MAJORIS <i>Christian Knigge & Janet E. Drew</i>	445

CONTENTS

v

HUBBLE SPACE TELESCOPE SPECTROSCOPY OF THE CARBON STAR TX PISCUM <i>Kenneth G. Carpenter, Richard D. Robinson, Hollis R. Johnson, Kjell Eriksson, Bengt Gustafsson, Frank Pijpers, Francois Querci, & Monique Querci</i>	Page 457
PREACCELERATION OF ANOMALOUS COSMIC RAYS IN THE INNER HELIOSPHERE <i>J. Giacalone, J. R. Jokipii, R. B. Decker, S. M. Krimigis, M. Scholer, & H. Kucharek</i>	471
PLASMA HEATING BY ALFVÉN WAVE FILAMENTATION: A RELEVANT MECHANISM IN THE SOLAR CORONA AND THE INTERSTELLAR MEDIUM <i>Stéphanie Champeaux, Adriana Gazol, Thierry Passot, & Pierre-Louis Sulem</i>	477
SOLAR INTERFACE DYNAMOS. I. LINEAR, KINEMATIC MODELS IN CARTESIAN GEOMETRY <i>K. B. MacGregor & P. Charbonneau</i>	484
SOLAR INTERFACE DYNAMOS. II. LINEAR, KINEMATIC MODELS IN SPHERICAL GEOMETRY <i>P. Charbonneau & K. B. MacGregor</i>	502
A SOLAR FLARE MODEL BASED ON MAGNETIC RECONNECTION BETWEEN CURRENT-CARRYING LOOPS <i>D. B. Melrose</i>	521
FORCE-FREE AND POTENTIAL MODELS OF A FILAMENT CHANNEL IN WHICH A FILAMENT FORMS <i>D. H. Mackay, V. Gaizauskas, G. J. Rickard, & E. R. Priest</i>	534
THE HANLE EFFECT AS A DIAGNOSTIC OF MAGNETIC FIELDS IN STELLAR ENVELOPES. I. THEORETICAL RESULTS FOR INTEGRATED LINE PROFILES <i>R. Ignace, K. H. Nordsieck, & J. P. Cassinelli</i>	550
[O V] IN THE ULTRAVIOLET SPECTRA OF GASEOUS NEBULAE <i>F. C. McKenna, F. P. Keenan, L. H. Aller, S. Hyung, W. A. Feibelman, K. A. Berrington, J. Fleming, & A. Hibbert</i>	571
THE PHOTODISSOCIATION OF SiH ⁺ IN INTERSTELLAR CLOUDS AND STELLAR ATMOSPHERES <i>P. C. Stancil, K. Kirby, A. B. Sannigrahi, R. J. Buenker, G. Hirsch, & J.-P. Gu</i>	574
ERRATUM DISSOCIATIVE RECOMBINATION OF H ₂ ⁺ MOLECULAR IONS IN HYDROGEN PLASMAS BETWEEN 20 K AND 4000 K <i>I. F. Schneider, O. Dulieu, A. Giusti-Suzor, & E. Roueff</i>	580
NEW INSTRUCTIONS TO AUTHORS—REVISED 1 JUNE 1997	i
1997 SEPTEMBER 10, Number 2	
REIONIZATION OF THE UNIVERSE AND THE EARLY PRODUCTION OF METALS <i>Nickolay Y. Gnedin & Jeremiah P. Ostriker</i>	581
THE STATISTICS OF DENSITY PEAKS AND THE COLUMN DENSITY DISTRIBUTION OF THE Ly α FOREST <i>Lam Hui, Nickolay Y. Gnedin, & Yu Zhang</i>	599
THE SPECTRUM OF THE COSMIC MICROWAVE BACKGROUND ANISOTROPY FROM THE COMBINED COBE FIRAS AND DMR OBSERVATIONS <i>D. J. Fixsen, G. Hinshaw, C. L. Bennett, & J. C. Mather</i>	623
MAXIMUM LIKELIHOOD COMPARISONS OF TULLY-FISHER AND REDSHIFT DATA: CONSTRAINTS ON Ω AND BIASING <i>Jeffrey A. Willick, Michael A. Strauss, Avishai Dekel, & Tsafir Kolatt</i>	629
THE METALLICITY OF HIGH-REDSHIFT GALAXIES: THE ABUNDANCE OF ZINC IN 34 DAMPED Ly α SYSTEMS FROM $z = 0.7$ TO 3.4 <i>Max Pettini, Linda J. Smith, David L. King, & Richard W. Hunstead</i>	665
INCLINATION EFFECTS IN SPIRAL GALAXY GRAVITATIONAL LENSING <i>Ariyeh H. Maller, Ricardo A. Flores, & Joel R. Primack</i>	681
FEMTOLENS IMAGING OF A QUASAR CENTRAL ENGINE USING A DWARF STAR TELESCOPE <i>Andrew Gould & B. Scott Gaudi</i>	687
BRIGHT LENSES AND OPTICAL DEPTH <i>Robert J. Nemiroff</i>	693
THE MACHO PROJECT LARGE MAGELLANIC CLOUD MICROLENSING RESULTS FROM THE FIRST TWO YEARS AND THE NATURE OF THE GALACTIC DARK HALO <i>C. Alcock, R. A. Allsman, D. Alves, T. S. Axelrod, A. C. Becker, D. P. Bennett, K. H. Cook, K. C. Freeman, K. Griest, J. Guern, M. J. Lehner, S. L. Marshall, B. A. Peterson, M. R. Pratt, P. J. Quinn, A. W. Rodgers, C. W. Stubbs, W. Sutherland, & D. L. Welch (The MACHO Collaboration)</i>	697

	Page
SPECTROSCOPY OF PKS 0528-250: NEW LIMITS ON CO ABSORPTION AND EMISSION <i>Jian Ge, Jill Bechtold, Constance Walker, & John H. Black</i>	727
THE STEEPNESS RATIO TECHNIQUE: A NEW METHOD TO ANALYZE ROSAT ALL-SKY SURVEY	738
EXTENDED SOURCES <i>S. De Grandi, S. Molendi, H. Böhringer, G. Chincarini, & W. Voges</i>	
BAR-DRIVEN SPIRAL DENSITY WAVES AND ACCRETION IN GASEOUS DISKS <i>Chi Yuan & Chao-Lin Kuo</i>	750
EVIDENCE OF AN IONIZED IRON EMISSION LINE FROM THE RADIO-QUIET QUASAR E1821+643 BY ASCA <i>A. Yamashita, C. Matsumoto, M. Ishida, H. Inoue, T. Kii, K. Makishima, T. Takahashi, & M. Tashiro</i>	763
MULTIWAVELENGTH MONITORING OF THE BL LACERTAE OBJECT PKS 2155-304 IN 1994 MAY. I. THE GROUND-BASED CAMPAIGN <i>Joseph E. Pesce, C. Megan Urry, Laura Maraschi, Aldo Treves, Paola Grandi, Ronald I. Kollgaard, Elena Pian, Paul S. Smith, Hugh D. Aller, Margo F. Aller, Aaron J. Barth, David A. H. Buckley, Elvira Covino, Alexei V. Filippenko, Eric J. Hooper, Michael D. Joner, Lucyna Kedziora-Chudczer, David Kilkenny, Lewis B. G. Knee, Michael Kunkel, Andrew C. Layden, Antonio Mário Magalhães, Fred Marang, Vera E. Margoniner, Christopher Palma, Antonio Pereyra, Claudia V. Rodrigues, Andries Schutte, Michael L. Sitko, Merja Tornikoski, Johan van der Walt, Francois van Wyk, Patricia A. Whitlock, & Scott J. Wolk</i>	770
MULTIWAVELENGTH MONITORING OF THE BL LACERTAE OBJECT PKS 2155-304 IN 1994 MAY. II. THE IUE CAMPAIGN <i>Elena Pian, C. Megan Urry, Aldo Treves, Laura Maraschi, Steve Penton, J. Michael Shull, Joseph E. Pesce, Paola Grandi, Tsuneo Kii, Ron I. Kollgaard, Greg Madejski, Herman L. Marshall, Willem Wamsteker, Annalisa Celotti, Thierry J.-L. Courvoisier, Renato Falomo, Henner H. Fink, Ian M. George, & Gabriele Ghisellini</i>	784
MULTIWAVELENGTH MONITORING OF THE BL LACERTAE OBJECT PKS 2155-304 IN 1994 MAY. III. PROBING THE INNER JET THROUGH MULTIWAVELENGTH CORRELATIONS <i>C. Megan Urry, Aldo Treves, Laura Maraschi, Herman L. Marshall, Tsuneo Kii, Greg Madejski, Steve Penton, Joseph E. Pesce, Elena Pian, Annalisa Celotti, R. Fujimoto, F. Makino, C. Otani, R. M. Sambruna, K. Sasaki, J. M. Shull, Paul S. Smith, T. Takahashi, & M. Tashiro</i>	799
STAR-FORMING PROCESSES FAR FROM THE GALACTIC DISK: INOPERATIVE OR INDOLENT WHERE OPERATIVE <i>Dimitris M. Christodoulou, Joel E. Tohline, & Francis P. Keenan</i>	810
INFRARED SEARCH FOR YOUNG STARS IN H I HIGH-VELOCITY CLOUDS <i>Željko Ivezić & Dimitris M. Christodoulou</i>	818
TYPE X SILICON CARBIDE PRESOLAR GRAINS: TYPE Ia SUPERNOVAE CONDENSATES? <i>Donald D. Clayton, David Arnett, Jave Kane, & Bradley S. Meyer</i>	824
WOBBLING ACCRETION DISKS, JETS, AND POINT-SYMMETRIC NEBULAE <i>Mario Livio & J. E. Pringle</i>	835
EFFECT OF PHASE TRANSITIONS ON WAVE DYNAMICS IN TWO-PHASE GASEOUS SYSTEMS <i>Hideyuki Kamaya & Yuri Shchekinov</i>	840
LONG-SLIT SPECTROPHOTOMETRY OF THE H II REGIONS GUM 38A AND GUM 38B <i>Léo Girardi, Eduardo Bica, Miriani G. Pastoriza, & Cláudia Winge</i>	847
A STUDY OF THE PHYSICS AND CHEMISTRY OF TMC-1 <i>P. Pratap, J. E. Dickens, R. L. Snell, M. P. Miralles, E. A. Bergin, W. M. Irvine, & F. P. Schloerb</i>	862
ASCA OBSERVATIONS OF THE BARNARD 209 DARK CLOUD AND AN INTENSE X-RAY FLARE ON V773 TAURI <i>Stephen L. Skinner, Manuel Güdel, Katsuji Koyama, & Shigeo Yamauchi</i>	886
KINETICS OF ELECTRON-POSITRON PAIR PLASMAS USING AN ADAPTIVE MONTE CARLO METHOD <i>Ravi P. Pilla & Jacob Shaham</i>	903
A SHOCK-PATCHING CODE FOR ULTRARELATIVISTIC FLUID FLOWS <i>Linqing Wen, Alin Panaitescu, & Pablo Laguna</i>	919
GAMMA-RAY BURST SPECTRAL EVOLUTION THROUGH CROSS-CORRELATIONS OF DISCRIMINATOR LIGHT CURVES <i>David L. Band</i>	928

CONTENTS

vii

A SEARCH FOR AN X-RAY COUNTERPART TO THE EXTREMELY BRIGHT 1993 JANUARY 31 GAMMA-RAY BURST <i>R. Shibata, T. Murakami, Y. Ueda, A. Yoshida, F. Tokanai, C. Otani, N. Kawai, & K. Hurley</i>	Page 938
THE INITIAL STELLAR MASS FUNCTION FROM RANDOM SAMPLING IN A TURBULENT FRACTAL CLOUD <i>Bruce G. Elmegreen</i>	944
ON THE EVOLUTION OF LOW-MASS X-RAY BINARIES UNDER THE INFLUENCE OF A DONOR STELLAR WIND INDUCED BY X-RAYS FROM THE ACCRETOR <i>Icko Iben, Jr., Alexander V. Tutukov, & Alexandra V. Fedorova</i>	955
BALMER LINE EMISSION PROFILES FROM CATAclySMIC VARIABLE ACCRETION DISK CHROMOSPHERES <i>Donald H. Ferguson</i>	987
CHROMOSPHERIC ACTIVITY IN DWARF AND EVOLVED LATE A- AND EARLY F-TYPE STARS <i>Brian L. Rachford</i>	994
ECLIPSE TIMINGS OF THE LOW-MASS X-RAY BINARY EXO 0748-676. II. DETECTION OF AN APPARENT ORBITAL PERIOD CHANGE AND OF ORBITAL PERIOD NOISE <i>Paul Hertz, Kent S. Wood, & Lynn R. Cominsky</i>	1000
THE ULTRAVIOLET SPECTRUM OF THE MAGNETIC CATAclySMIC VARIABLE RX J1802.1+1804 <i>C. R. Shrader, K. P. Singh, & P. Barrett</i>	1006
ROSAT POSITION OF GRO J1744-28 AND SEARCH FOR ITS NEAR-INFRARED COUNTERPART <i>T. Augsteijn, J. Greiner, C. Kouveliotou, J. van Paradijs, C. Lidman, P. Blanco, G. J. Fishman, M. S. Briggs, J. Komers, R. Rutledge, W. H. G. Lewin, A. A. Henden, C. B. Luginbuhl, F. J. Vrba, & K. Hurley</i>	1013
MEAN PULSE SHAPE AND POLARIZATION OF PSR J0437-4715 <i>J. Navarro, R. N. Manchester, J. S. Sandhu, S. R. Kulkarni, & M. Bailes</i>	1019
EXPLOSIVE NUCLEOSYNTHESIS IN AXISYMMETRICALLY DEFORMED TYPE II SUPERNOVAE <i>Shigehiro Nagataki, Masa-aki Hashimoto, Katsuhiko Sato, & Shoichi Yamada</i>	1026
X-RAY AND RADIO STUDIES OF A CORONAL ERUPTION: SHOCK WAVE, PLASMOID, AND CORONAL MASS EJECTION <i>N. Gopalswamy, M. R. Kundu, P. K. Manoharan, A. Raoult, N. Nitta, & P. Zarka</i>	1036
DEEP SURVEY OF SOLAR NANOFLARES WITH YOHKOH <i>Toshifumi Shimizu & Saku Tsuneta</i>	1045
LARGE CONVECTIVE EVENTS AND THEIR AFTERMATH IN A ROTATING STAR <i>Charles L. Wolff</i>	1058
ON A BABCOCK-LEIGHTON SOLAR DYNAMO MODEL WITH A DEEP-SEATED GENERATING LAYER FOR THE TOROIDAL MAGNETIC FIELD. IV. <i>Bernard R. Durney</i>	1065



